

Housing for an airbag device

The invention relates to a housing for an airbag device according to the introductory section of Patent Claim 1.

A side airbag device is known from WO00/06421 A1 for protection of vehicle occupants on the rear seat of a vehicle. This side airbag device is formed and attached to the vehicle body in the area of door opening in such a way that its airbag pushes between a vehicle occupant and the inner wall of the vehicle structure in cases where the vehicle occupant has to be retained.

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In addition, EP 0 826 565 A2 describes a side airbag module which is located at the side in the backrest of a vehicle seat. In the case of this side airbag module, a gas generator and an airbag are embedded in the foam of the backrest in such a way that only a housing cover and seams in the seat cover indicate the presence of the side airbag module. In addition, a weakness in the material is formed in the foam and in the housing cover respectively, which is not visible from the outside, which functions in the sense of a tear line when the airbag unfolds, driven by the gas generator.

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In addition, an elastic housing cover for an airbag device on a vehicle steering wheel is known from DE 197 30 837 A1 in which this housing cover exhibits set and defined break locations at least in some areas, which are torn open to allow release of an airbag unfolding to retain vehicle occupants in case of an accident. In order to achieve a

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good outer appearance as regards the housing cover, these set break points, which are in the form of perforations, are located in a fixing section not visible from the inside of the vehicle.

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Finally, side airbag devices with a plastic housing are known, in whose hollow space a container of a gas generator as well as an airbag are located. In addition, such a housing exhibits a housing cover which faces towards the vehicle occupants when mounted, on whose inner side at least one material weakness is provided in the form of a tear line, which can be torn open in case of accident by the airbag which is unfolding in order to retain the vehicle occupants.

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A disadvantage of the last-named side airbag devices is that these material weaknesses are formed in such a pronounced way as deep grooves that they can also be seen from the side of the housing cover which faces towards the vehicle occupants. This has a negative effect on the overall impression made by the interior of the vehicle, so that a means of avoiding this effect would be useful.

Against this background, it is the task of the invention to present a housing for an airbag module which on the one hand is formed so that it can be torn open by the unfolding airbag in the event that the airbag is to retain the passengers, and where on the other hand the housing cover facing the passenger compartment does not reveal that material weaknesses are present in the housing.

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The solution to this problem results from the characteristics of the main claim, while advantageous further

developments and forms of the invention are described in the subclaims.

5 The invention is based on the recognition that the
aforementioned weaknesses in the material are visible on
the interior of the housing cover in particular because
they are comparatively deep in form. To be precise, this
material weakness is formed in the last-mentioned state of
the art in such a way that only a very thin material skin
10 is present.

In order to prevent the weaknesses from being visible,
it is first intended to make the material weakness of the
housing cover in the area of the tear lines less pronounced
15 than in the state of the art, so that this material weak-
ness is no longer visible from the passenger compartment
side.

AS the forces for tearing open the airbag cover which
20 can be applied by the unfolding airbag are limited, a pref-
erably concealed tear line is additionally provided, which
is easier to tear open than the aforementioned material
weaknesses in the housing body. For this purpose, this tear
line is formed in the housing of the airbag device by a
25 perforation in such a way that the perforation exhibits
comparatively large gaps and small solid sections of mate-
rial. This perforation preferably replaces a weakness in
the material formed in the state of the art by means of a
cut-out of the material in the housing cover.

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The result of the invention is that the weakness in
the material is no longer visible and the housing cover can

be torn open with the same airbag forces as in conventional airbag devices.

According to the main claim, therefore, the invention
5 relates to a housing for an airbag device in a motor vehicle, which is provided with a hollow space for accommodation of a container of a gas generator and an airbag. In addition, the housing exhibits a basic structure, and a housing cover which is connected with this basic structure
10 and which faces the vehicle occupants when mounted in the vehicle. At least one material weakness is formed on the inner side of the housing cover, which can be torn open if the airbag unfolds in order to retain the occupants of the vehicle.

15 In order to solve the task set, in combination with the aforementioned characteristics it is also intended that the material weaknesses are so slight that they are not visible from the side of the housing cover which faces towards the vehicle interior, and that the housing cover is
20 also connected with the basic housing structure by means of a perforation.

This perforation is preferably formed at a location on
25 an area of the housing which is not visible to the vehicle occupants when installed in the vehicle, as described above.

Furthermore, in a further development of the invention
30 the perforation is covered by a section of the housing.

In order now to be able to achieve particularly advantageous upwards opening of the housing cover away from the

housing, it is preferably provided that the axis of the
tear line of the perforation is basically parallel to the
vertical axis of the vehicle. This means that the airbag
mostly unfolds in the direction of the front side of the
5 vehicle.

In another embodiment of the housing according to the
invention, the perforation is formed on a housing section
of the basic housing structure on the vehicle body side.
10 Within this arrangement, the perforation is formed in an
area of the housing where there is no other material by
means of bridges, which form a connection between the hous-
ing section on the vehicle body side and the housing cover.

15 In order to be able to ensure optimum tearing and up-
wards opening of the housing cover, it is also suggested
that the perforation and the at least one material weakness
are basically orientated vertically to one another. This
means that two material weakness lines and one perforation
20 line form a basically rectangular tear-open window, through
which the unfolding airbag can exit from the housing of the
airbag device.

In order to make the upwards opening of the aforemen-
25 tioned tear-open window in the housing cover easier, it is
preferably provided that a further material weakness is
formed on the inner side of the housing cover, which is
located to close to, and in parallel axis to, an opening
axis, or axis of rotation, in this housing cover.

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This material weakness in the area of the aforemen-
tioned axis of rotation is preferably formed in such a way
that there the housing cover does not tear open, but never-

theless it is possible for a part of the housing cover to flap open by means of the unfolding airbag.

5 In order that the housing of the airbag device can implement the structure according to the invention as well as the aforementioned embodiments and further developments of the invention, it is provided that the housing is manufactured of plastic, preferably of thermoplastic type.

10 The housing according to the invention can be used for all types of airbag devices. Preferably it is used for side airbag devices in motor vehicles.

15 The invention is described in more detail below by means of an embodiment which is shown in the drawings in schematic form. The drawings are as follows:

- Fig. 1 A view of a side airbag device in the area of a rear seat of a motor vehicle,
- 20 Fig. 2 A cross-section through the side airbag device according to Fig. 1 at location A-A,
- Fig. 3 A view of the side airbag device according to Fig. 2 on a housing part on the vehicle side and
- 25 Fig. 4 A birds-eye view of the side airbag device according to Fig. 1 in non-installed state.

30 As Fig. 1 shows, the side airbag device 4 which is shown there and in all other figures is of the type which is fixed to a vehicle body 22 in the area of a door opening 1. Within this arrangement, side airbag device 4 is basically arranged between door opening 1 and the backrest 3 of a bench seat 2, whereby an area of side airbag device 4

indicated by means of a dotted line is covered by backrest 3.

5 In a case where vehicle occupants have to be retained, in other words, for example, in case of a side impact of another vehicle on the side structure of vehicle body 22, the passenger compartment side housing cover 6 of airbag device 4 is partly torn open by expanding airbag 12, so that this latter basically exits from the cover in the direction of longitudinal vehicle axis 24.

10 Fig. 2 shows, in a cross-section A-A through side airbag device 4 according to Fig. 1, that a housing 5 with basic housing structure 27 belongs to the side airbag device 4, which basically comprises a vehicle body side housing section 26, a passenger compartment side housing section 20 and a housing cover 6.

20 A container 8 of a gas generator 9 as well as of a folded airbag 12 are inserted in this housing 5 and fixed by means of fixing hooks which can be clicked into fixing openings 11,21 of housing 5. As the view according to Fig. 3 of the vehicle body side housing section 26 in particular shows, a centering peg 7 is also formed on this housing section, which can be inserted into a corresponding acceptance opening in vehicle body 22 as an assembly aid.

25 In addition, a fixing section 18 is formed on this vehicle body side housing section 26, through whose opening a dowel pin, for example, can be guided on the vehicle body 22 and the side airbag device 4 can be screwed fast there.

AS the cross-section through housing cover 6 of housing 5 in Fig. 2 as well as the side views of the airbag device clearly show, this housing cover 6 is connected with the vehicle body side housing section 26 by means of a perforation section. This perforation 13 is formed of a section which is basically free of material, in which bridges 19 provide for a connection between the two aforementioned components 6, 26. In this arrangement, the perforation openings, or the width of bridges 19, are formed in such a way that the forces which unfold the airbag 12 if a vehicle occupant is to be retained can tear these open easily on the one hand, but on the other hand it is ensured than in normal cases the airbag device 4 is securely closed.

In order that this perforation 13 is not visible to the vehicle occupants, the perforation is located on the vehicle body side housing section 26 and is preferably also covered by a cover section 23 of housing cover 6.

As Fig. 2 in connection with Fig. 4 shows, material weaknesses 14, 16, 17 are provided on the inner side of housing cover 6, which are basically orientated vertically to one another. These material weakness are preferably formed as grooves or cut-outs in housing cover 6, whose depth differs depending on use.

While material weaknesses 16,17 are so considerable that the forces applied to housing cover 6 by unfolding airbag 12 are sufficient to tear open the housing at these locations, material weakness 14 is designed in such a way that it is does not tear open and only allows the opening window of side airbag device 4 thus formed to flap open

around a axis of rotation 15 which takes effect in the area of this material weakness 14.

5 This axis of rotation 15 is preferably formed in such a way that it is orientated basically so as to be parallel to vertical vehicle axis 25 (Fig. 1). In this embodiment, this construction therefore also determines the orientation of tear line of perforation 13, whose axis is also orientated parallel to the vertical vehicle axis (25).

10 As the above explanations make clear, the structure of housing 5 of airbag device 4 according to the invention achieves the effect that material weaknesses 14, 16, 17 cannot be recognised on the housing cover 6 which faces the passenger compartment, and that these material weaknesses 15 16,17 can nevertheless be opened by the forces originating from unfolding airbag 12.

20 Regardless of the fact that housing 5 according to the invention is particularly suitable for side airbag devices which are fixed onto the vehicle body, another housing formed according to the invention can also be advantageously used in side airbag devices in seat backs.

Reference numbers

	1	Door opening in a vehicle body
5	2	Bench seat
	3	Backrest
	4	Side airbag module
	5	Side airbag module housing
	6	Housing cover
10	7	Centering peg
	8	Gas generator container
	9	Gas generator
	10	Gas generator container clipping hooks
	11	Clipping opening
15	12	Airbag
	13	Perforation
	14	Material weakness in area of flap axis
	15	Axis of rotation
	16	Material weakness
20	17	Material weakness
	18	Fixing section
	19	Perforation bridge
	20	Passenger compartment side housing section
	21	Latching opening
25	22	Vehicle body
	23	Cover section of housing cover
	24	Longitudinal vehicle axis
	25	Vertical vehicle axis
	26	Vehicle body side housing section
30	27	Basic housing structure